Computer Science

SCALE ANALYSIS FOR PIXEL LEVEL TEXTURE D. H. Xu *[1], L. Shapiro [2], D. Raicu[1], J. D. Furst[1], DePaul University[1], School of Computer Science, Telecommunications, and Information Systems, IL 60604, University of Washington[2], Department of Computer Science and Engineering, WA 98195.

With the dramatic increase in medical imaging techniques and the ever growing collections of various medical images, there is a great demand for new approaches in texture analysis on medial images. Texture is one of the most used features in medical image interpretation, and is applicable to a wide variety of image processing problems. Although texture is a well-studied property, most texture features are extracted either using a global scale or an uniform texture scale across the whole image. Since texture is a local property, texture features computed at a wrong scale can produce non-meaningful results.

In this paper we present a new approach in texture features extracted at dynamic texture scales which will lead to automatic classification and segmentation on medical images. Researchers at Berkley proposed scale selection method based on edge polarity, a local image property derived from gradient of L* component of a color image in L*a*b* format, and extracted three texture features (polarity, anisotropy, local contrast) for each pixel on the selected texture scale. While their focus is on applying the pixel level texture at different scales for outdoor scenes, we focus our research to the medical field, in particular to protein crystal images. Furthermore we used the pixel level texture features to cluster pixels in these images based on their texture similarities, with the goal of performing image classification.

As future work, we will apply dynamic texture scale analysis for the segmentation task in the medical field. We will be also incorporating other texture features (co-occurrence, run-length encoding, etc.) in the scale analysis.